

## CHAPTER 2

### PROPOSED ACTION AND ALTERNATIVES

#### 2.0 PROPOSED ACTION

The Merit Proposed Action consists of drilling, completing, and operating 12 new productive coalbed methane (CBM) wells, converting two existing shut-in wells to water injection service, and related production and water disposal facilities in the Brown Cow Pod project area (BCPA) of the Atlantic Rim CBM project area (ARPA) (Figure 2-1). The proposal is a part of the Interim Drilling Plan associated with the Atlantic Rim environmental impact analysis in Carbon County, Wyoming. The BCPA is located within the existing development of the Browning Field, an historic oil field comprised of 14 producing or shut-in oil wells. Access to this production is already established and currently in use.

The Atlantic Rim Environmental Impact Statement (EIS) was begun in 2001, and is expected to be completed on or around January 2005. During the interim period before the EIS is completed, the BLM, Rawlins Field Office (RFO) is planning to allow the drilling of up to 200 exploratory wells. Currently, oil and gas operators have identified 9 areas or “pods” where these exploratory wells would be located, one of which is the Brown Cow Pod.

In addition to well sites, other facilities, such as access roads, gas gathering and water disposal pipelines, electrical utilities, and compressors, would be developed to facilitate natural gas (methane) production in the well fields. The interim project would develop over a 6 to 12 month period. The productive life of the project is estimated between 10 to 20 years.

Specific components of the Brown Cow coalbed methane project are shown in the [Master Surface Use](#) and [Master Drilling Plan](#) (Appendix C), and summarized in the following sections of the Merit Plan of Operations. Additional site-specific environmental analyses and resource information would be contained in the individual well Application for Permit to Drill (APD) and/or Right-of-Way (ROW) application when submitted to the BLM. Merit bases this proposed activity on their preliminary development plans submitted to the BLM in 2003.

#### 2.1 PLAN OF OPERATIONS

##### 2.1.1 Preconstruction Planning and Site Layout

Merit would follow the procedures outlined below to gain approval for proposed activities on BLM-administered lands within the BCPA.

- € Prior to the start of construction activities, Merit would submit a Notice of Staking (NOS), (a NOS was received on August 9, 2002 by the RFO for 11 of the 12 CBM wells in this project, the single remaining well (Brown Cow Federal #14-13) did not have a NOS submitted to the RFO), APD, or ROW Application to the BLM with a map showing the specific location of the proposed activity (e.g., individual drill sites, pipeline corridors, access roads, or other facilities). The application would include site-specific plans where necessary to describe the proposed development (i.e., drilling plans with casing/cementing program; surface use plans with road and drill pad construction details; and site specific reclamation plans, etc.). Approval of all operations would be obtained in accordance with authority prescribed in Onshore Oil and Gas Order No. 1 (Approval of Operations on Onshore Federal and Indian Oil and Gas Leases).

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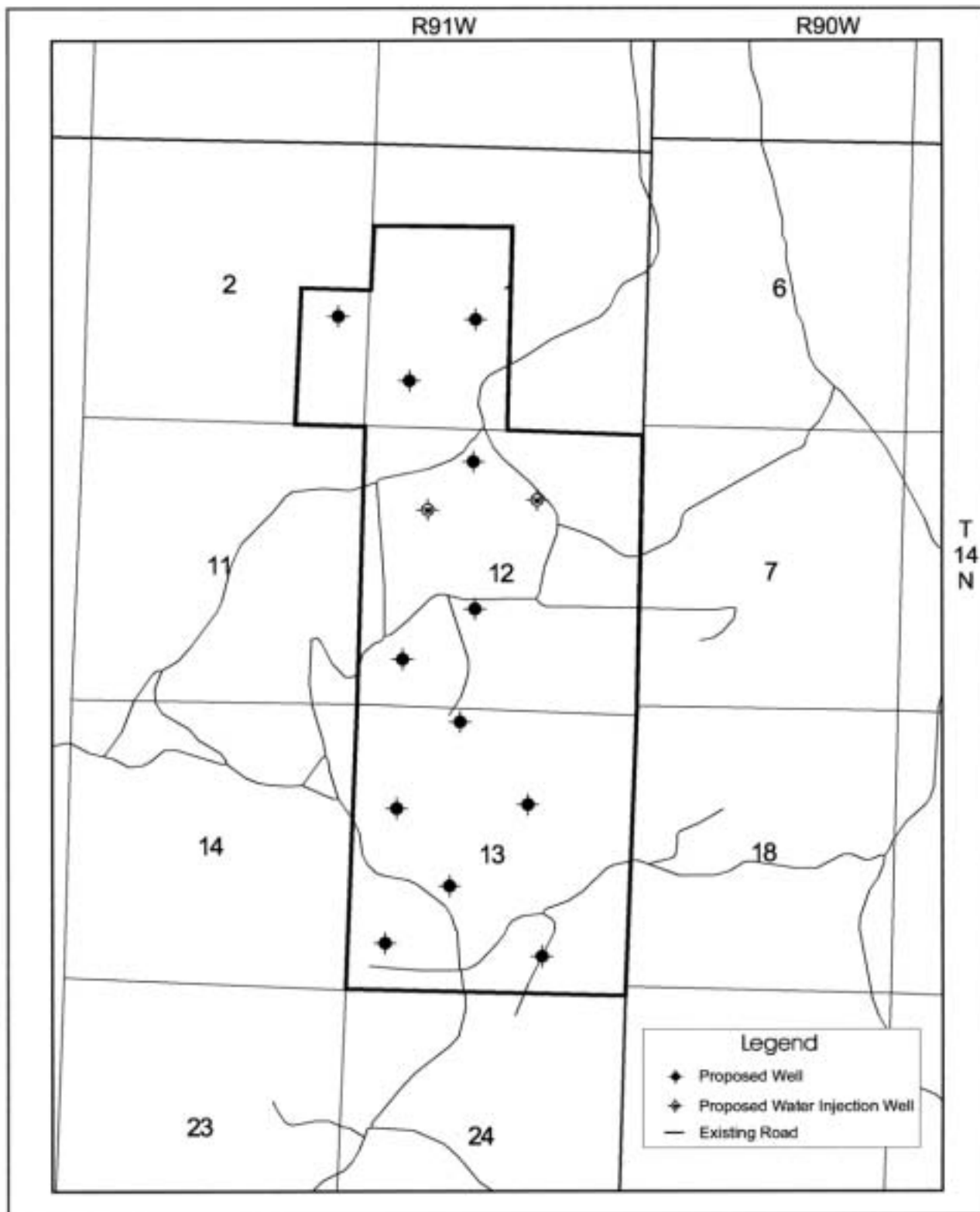


Figure 2-1. Brown Cow Pod - Atlantic Rim Coalbed Methane Project.

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- € The proposed project components have been staked by Merit and inspected at an onsite inspection on August 15, 2003 by Merit's permit agent and members of the BLM interdisciplinary team to ensure consistency with the approved Great Divide Resource Area RMP, best management practices, approved mitigation measures incorporated into the Atlantic Rim Interim Drilling Policy, and plans provided by Merit in the APD or ROW Application.
- € More detailed construction plans, when required by the BLM for the proposed development, would be submitted to the BLM by Merit. The plans would address concerns that may exist concerning construction standards, required mitigation, etc. Changes in these plans between Merit and the BLM, if necessary to resolve differences, would be based on field inspection findings and would take place either during or after the BLM on-site inspection.
- € Merit and/or its contractors would revise the APD or ROW Application as necessary per reviews with the BLM. The BLM would complete a project-specific environmental analysis that incorporates agreed upon construction and mitigation standards. The BLM would then approve the specific proposal and attach the Conditions of Approval to the permit. Merit must then commence with the proposed activity within one year. An extension to drill may be granted by the BLM.

Following is a general discussion of proposed construction techniques to be used by Merit. These construction techniques would be applicable to drill site, pipeline, and access road proposals within the BCPA, and may vary between the well sites.

### 2.1.2 Construction and Drilling Phase

#### 2.1.2.1 Access Road Construction

The primary road access utilized by Merit to access the BCPA is Wild Horse Road, BLM Road 3309, from Wyoming State Highway 789 (Figure 1-2). Access to the pod is provided by existing one-lane graveled and partially graveled BLM and Carbon County roads as described in Chapter 1 (Section 1.1.2, Location). Access to drill locations from the existing road network already in place would be provided primarily by the upgrade of existing two-track roads traversing over natural terrain or along pipeline rights-of-way whenever feasible.

Merit proposes to construct required new access roads across public lands in accordance with BLM Manual 9113 standards for "Resource" roads. Newly constructed roads will be constructed as surfaced crowned and ditched roads (minimum 14 foot road with turnouts every 1000' in accordance with the BLM 9113 manual). Roads would be located to minimize disturbances and maximize transportation efficiency. Roads would be closed and reclaimed by Merit when they are no longer required for production operations, unless otherwise directed by the BLM.

Where two-track roads are not available for upgrade, or where existing two-track roads are aligned in an improper location, access roads would be constructed. The amount of new construction would be minimal because of the existing road system already in place. Several small areas involve steep slopes and would require road cutting (using balanced cut & fill techniques) for equipment access and daily visits during the testing phase. All such areas would be clearly marked in the field prior to any work. The top 6 to 8 inches of topsoil would be stockpiled in windrows in all areas where road cutting and/or surface material is needed.

Drainage crossings on the unimproved access routes within the project area would require crossings using culverts. Appropriately-sized culverts would be installed on all channel crossings. The total area to be disturbed would be flagged on the ground before construction

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begins.

### 2.1.2.2 Well Pad Design and Construction

All of the proposed coalbed methane wells would be drilled on lands administered by the BLM. A graded well pad would be constructed at the well sites. Drilling operations on flat terrain would disturb an area approximately 190 feet by 240 feet (approximately 1 acre) at each well site.

One temporary reserve pit 65 feet wide by 10 feet deep by 100 feet long would be excavated at each well and reclaimed after completion operations. Topsoil would be removed and stockpiled prior to excavating the well pad and pit as required by BLM. Reserve pit fluids would be allowed to dry by evaporation for approximately 6 to 12 months prior to reserve pit closure and drill site reclamation. The pits will be fenced on 3 sides during drilling and the 4<sup>th</sup> side would be fenced prior to rig move to prohibit wildlife and livestock from falling into the pit.

Where drilling on steeper slopes is necessary, the use of cut and fill construction techniques would be utilized. The use of cut and fill construction techniques to level work areas would be limited to areas where the land surface is too steep to allow the drill rig to set up over natural terrain. Three of the 12 wells will be drilled from existing well pads which are temporarily abandoned or have been plugged and abandoned. On these 3 wells, minimal cuts and fills will be necessary with the exception of the reserve pit, which would be located outside the old reclaimed reserve pit area. Drilling operations would be confined within a 190 feet by 240 feet well site area that is leveled and cleared of vegetation. (See Figure 2-2 for a typical CBM drill site layout). All vegetation would be removed and topsoil stockpiled on every location.

In the event drilling is non-productive, all disturbed areas, including the well site and new access road, would be reclaimed to the approximate landform that existed prior to construction within 2 years following drilling operations. Reclamation and site stabilization techniques would be applied as specified in the APD Surface Use Plan or the Right-of-Way Plan of Development (POD).

If drilling is productive, all access roads to the well site would remain in place for well servicing activities (i.e., maintenance, improvements, etc.). Partial reclamation would be completed on portions of the well pad(s) and access road ROW no longer needed within 2 years following drilling operations.

### 2.1.2.3 Drilling and Completion Operations

Drilling of the CBM well(s) would utilize a truck-mounted drilling rig. Additional equipment and materials needed for drilling operations would be trucked to the well site. Water for use in drilling the initial well in each pod would be obtained from a local source near the project area (Municipal Water Supply in Baggs, Wyoming). Depending on water quality, produced water from the initial CBM wells could be used as drilling water on future wells. Approximately 600 barrels of water (25,200 gallons) would be needed for drilling each well. Actual water volume used in drilling operations would be dependent upon the depth of the well and any fluid losses that might occur during drilling. The proposed project would require approximately 84,000 gallons (or 0.26 acre-feet) of water per well for cement preparation, well stimulation, and dust control. Drilling mud usually is native mud and bentonite. As hole conditions dictate, small amounts of polymer additives and/or potassium chloride salts may be added for hole cleaning and clay stabilization. Weight material consisting of barium sulfate probably will be required to control drilling pressures. Each well would require 2,600 barrels of water from the Colorado River system. For the entire project, drilling water requirements would be no more than 4.02 acre-feet. Drilling water requirements may be reduced if it is determined to be feasible to re-use

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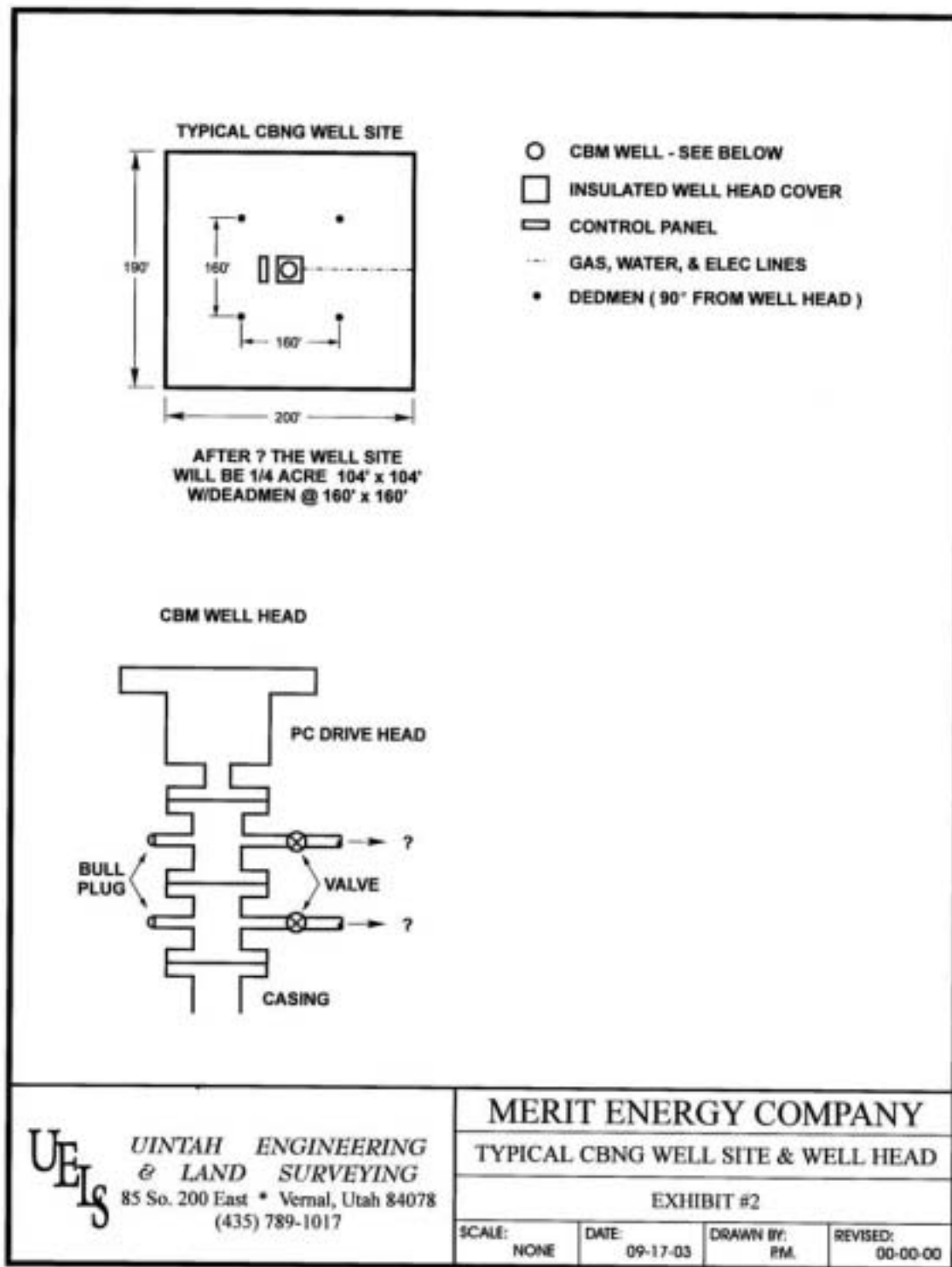


Figure 2-2. Typical CBM Drill Site Layout - Brown Cow Pod.

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some of the drilling water from previously-drilled wells.

Depending on the depth of the coal seam, each producing well would be drilled to a depth of 350 feet to 1,200 feet or deeper, and would have steel casing cemented from the top of the coal seam to the surface. The well control system would be designed to meet the conditions likely to be encountered in the hole and would be in conformance with BLM and State of Wyoming requirements.

The drilling and completion operation for a CBM well normally requires a maximum of 10 to 15 people at a time, including personnel for logging and cementing activities. Each well would take 6 days to drill, 4 days to complete, and 5 days to test. A well completion program will be initiated to determine gas and water production characteristics in preparation for production of gas from the drilled, cased, and cemented well. A mobile completion rig similar to the drill rig will be transported to the well site and used to complete a well. Methane gas may be vented and water temporarily discharged to a storage facility for a very short period of time during testing to determine whether wells would be produced. Once determined to be productive, wells would be shut-in until pipelines and other production facilities are constructed. If the well is determined not to be productive, it will be properly abandoned after obtaining concurrence with the BLM.

Conversion of existing gas wells for use as injection wells would be accomplished with the equipment and personnel used to complete the CBM wells. Depth of the injection wells is expected to range from 3,000 to 5,000 feet. Completion of each of the injection wells is expected to take approximately 7 to 14 days. Installation of surface equipment, holding tanks and pumping equipment would take approximately 14 days. A schematic of a typical injection facility is shown on Figure 2-3.

### **2.1.3 Production Operations**

#### **2.1.3.1 Well Production Facilities**

Wellhead facilities would be installed if the CBM wells are productive. A weatherproof covering would be placed over the wellhead facilities. At this time, no additional facility would be constructed at the well site for gas-water separation facilities. A downhole pump would be utilized to produce water from the uncased open hole or perforated interval. Methane gas would flow to the surface using the space between the production casing and the water tubing. The long-term surface disturbance (10 to 20 years) at each productive well location where cut and fill construction techniques are utilized would encompass approximately 0.005 acre. Well site production facilities typically would be fenced or otherwise removed from existing uses. A typical CBM production wellsite is described on Figure 2-2.

Pipeline trenches for well gathering lines are expected to disturb portions of 20 to 30-foot wide corridors temporarily and to be reclaimed as soon as practical after construction is completed. Trenches would be constructed along the access roads wherever possible. Separate gathering lines would be buried in the trenches and would transport methane gas to production pod facilities and produced water to injection wells. Central production facilities would be located at the existing Browning 3-12 location ([Figure C, Appendix C](#)).

At the conclusion of the project, roads, culverts, cattleguards, pipelines, stock watering facilities, or other structures could be left in place for any beneficial use as designated by the BLM. Water and produced water would be available to the BLM, with appropriations rights already properly filed with the Wyoming State Engineer's Office. All federally-owned surfaces that contain disturbed areas or facilities that are no longer needed would be reclaimed.

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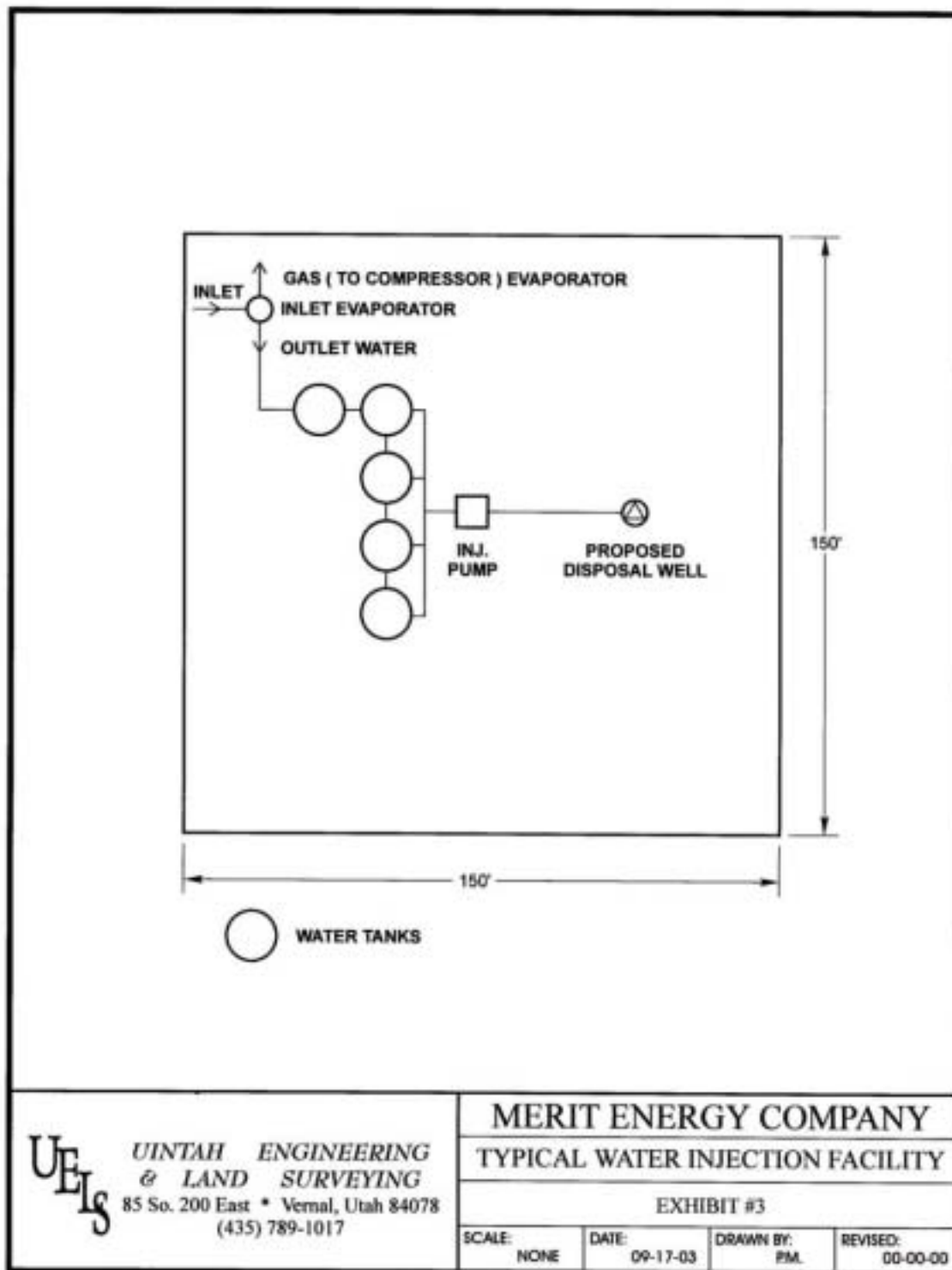


Figure 2-3. Schematic of a Typical Water Injection Facility.

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### **2.1.3.2 Power Generation**

Electricity would be used to power pumps during well development and to initiate and maintain production. Both natural gas-fired and diesel engine-powered generators would be used on a temporary basis at individual wells until electrical distribution lines are constructed. Either electrical motors or natural gas-fired reciprocating or microturbine engines would power booster or blower units. Future compressors are anticipated to be natural gas-fired or electrical units. Electrical lines would be buried along corridors of existing disturbance, on the opposite side of roadways from the water and gas gathering pipelines.

### **2.1.3.3 Pipelines**

Two types of pipelines would be constructed as part of the proposed project:

1. Gas-gathering pipeline systems (low pressure, from wellhead to pod building, and from pod building through trunkline to the compressor station).
2. Produced water-gathering pipeline systems.

An existing high pressure gas line would be utilized to transport gas from the field to interstate pipelines. Reclamation of pipeline corridors would occur as soon as practical after pipeline construction is completed.

#### **2.1.3.3.1 Gas-Gathering Pipeline Systems**

As part of the transportation corridor system linking the wells and ancillary facilities, gas-gathering pipelines and produced water-gathering pipelines would be constructed, placed together in the same trench/ditch, when practical, and buried. Construction and installation of pipelines would occur immediately after well drilling. Access roads typically would follow the pipeline right-of-way, except in a limited number of cases where topography dictates or as required by the BLM. Separate gathering lines would transport methane gas to production pod facilities and produced water away from wells to injection wells.

Pod gathering lines, a total of approximately 5.28 miles in length, are expected to disturb portions of 30-foot wide corridors, and would transport gas from each compression station to a trunkline.

Gas-delivery pipelines connecting compressor stations with existing transmission pipelines are expected to be located along existing roads. Disturbance related to these delivery lines is expected to be confined to areas not wider than 20 to 30 feet, located within rights-of-way to be established. The proposed gas-delivery system for the BCPA is shown on [Figure D](#), Appendix C.

Development would be constrained by the gas production from the coal seam(s) and by the pipeline capacity available to transport compressed gas to markets. Currently, the pipeline capacity within the project area is 12-60 MMCFD, depending on the pipeline connecting locations.

#### **2.1.3.3.2 Produced Water-Gathering System and Injection Facilities**

Produced water from individual wells would be collected and injected at the primary disposal well, the #1-2 well located in Section 2, T14N, R91W. The #3-12 and #4-12 shut-in gas wells in Section 12, T14N, R91W would be converted for use as injection wells as needed based on water flowrates (See Figure 2-1). Produced water-gathering pipelines would be constructed



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along the well access road wherever feasible, from the wellhead to injection well locations. The water lines would be placed together in the same trench/ditch as gas gathering lines wherever practical, and buried.

Transfer pumping stations would be utilized during production operations to transfer produced water from the coalbed methane well(s) to the disposal well. The transfer pumping stations are needed in those areas where elevation differences require supplemental pumping to transfer the produced water. Location of the transfer pumping stations would be identified on the plan overview for the Pod. The pumping station would consist of a 400 barrel water tank and a small centrifugal water pump. The pumping station would be confined to a 120 foot by 120 foot area. An approximate 3-foot berm would be constructed around the perimeter of the pumping station area to contain any potential spills. A small pump house would be constructed immediately outside of the bermed area to house the centrifugal pump. A typical water transfer facility is shown on Figure 2-4.

As explained in the Proposed Action discussion, no produced water would be discharged to surface drainages within the project area. This method of water disposal eliminates the need for a federal water management plan.

### **2.1.3.3.3 Gas-Delivery Pipelines and Compression**

Produced natural gas (methane) under wellhead pressure would move through the low pressure gas gathering system to a compressor station. Typical gathering system line pressure is less than 100 pounds per square inch (psi). Gas arriving at the compressor station would be compressed from line pressure to facilitate transport and introduction of the gas into an existing transmission pipeline. Merit intends to utilize an existing gathering pipeline to transport Brown Cow Pod field gas to an existing compressor station.

Compression of the gas at a field compressor station would increase the pressure to an estimated 700 to 1,450 psi. Merit expects to utilize the existing Wild Cow compression station for the gas produced in the Brown Cow Pod. The Wild Cow compressor currently has one 1,520 hp natural gas fired engine driven compressor. Merit is not planning additional compression at this time. However, one electric-powered screw compressor would be constructed in the SW  $\frac{1}{4}$  NW  $\frac{1}{4}$  of Section 12 (see Figure 2-1) if operating conditions require it. A typical compressor station and meter facility is shown on Figure 2-5.

### **2.1.4 Ancillary Facilities**

The Proposed Action would utilize the existing ancillary facility infrastructure within the BCPA where possible, including water disposal facilities and gas gathering pipelines. All wells, pipelines, and associated ancillary production facilities such as water wells and water treatment and disposal facilities would be operated in a safe manner by Merit as set forth by standard industry operating procedures. Routine maintenance of producing wells would be necessary to maximize performance and detect potential difficulties with gas production operations.

Each well location would be visited about every other day to ensure operations are proceeding in an efficient and safe manner. The visits would include checking separators, gauges, valves, fittings, and on-site storage of produced water. Routine on-site equipment maintenance would also be performed as necessary. Additionally, all roads and well locations would be regularly inspected and maintained to minimize erosion and assure safe operating conditions.

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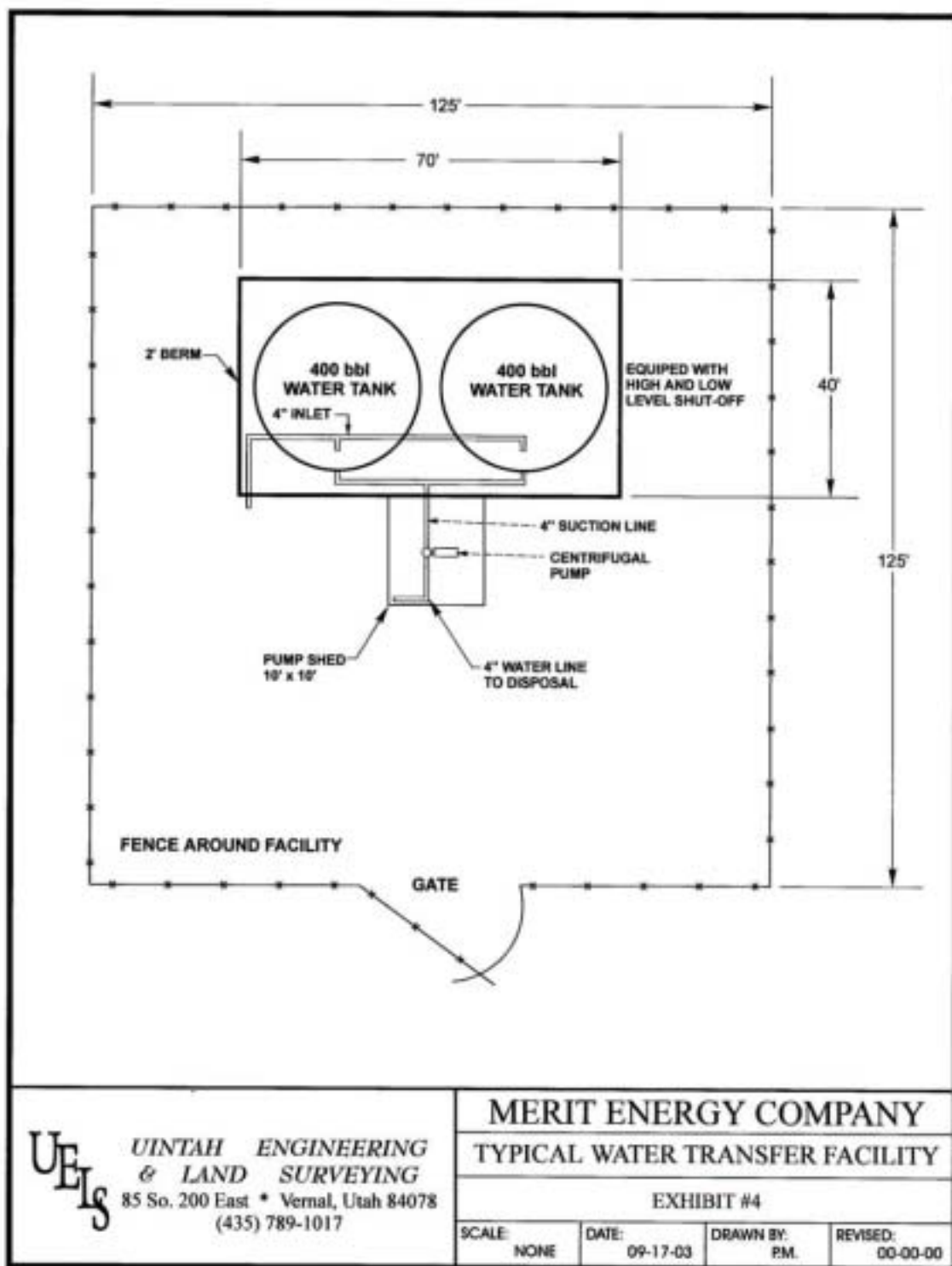


Figure 2-4. Typical Water Transfer Facility.

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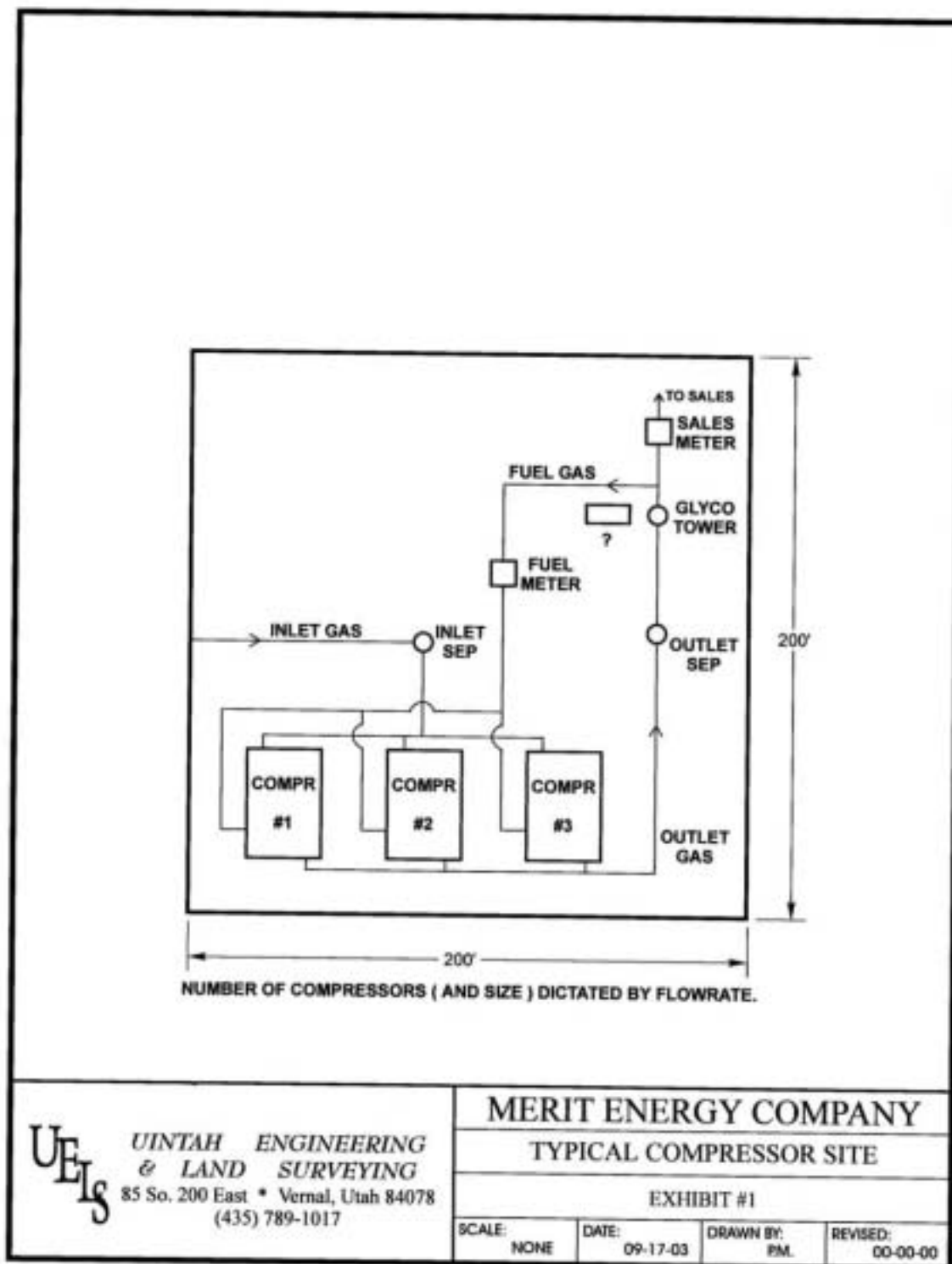


Figure 2-5. Typical Compressor Station and Meter Facility.

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### 2.1.5 Traffic Estimates and Work force Loading Schedule

Estimated traffic requirements for drilling, completion, and field development operations are shown in Table 2-1. The TRIP TYPE column lists the various service and supply vehicles that would travel to and from the well sites and production facilities. The ROUND TRIP FREQUENCY column lists the number of trips both external (i.e., to/from the pods), and internal (within the pod). The figures provided in Table 2-1 should be considered general estimates. Drilling and production activity levels may vary over time in response to weather and other factors.

**Table 2-1. Traffic Estimates**

TRIP TYPE	ROUND TRIP FREQUENCY	
	External (to/from pod)	Internal (within pod)
<b>Drilling (2 rigs, 2 crews/rig)</b>		
Rig supervisor	4/day	same
Rig crews	4/day	same
a Engineers	2/week	1/day/rig
Mechanics	4/week	same
b Supply delivery	1/week	2-4/day
c Water truck	1/month	2 round trips/day
Fuel trucks	2 round trips/well	same
d Mud trucks	1/week	2/day
e Rig move	8 trucks/well	8 trucks/well
Drill bit/tool delivery	1 every 2 weeks	same
<b>Completion</b>		
Smeal rig/crew	1/day	same
Cement crew	2 trips/well	same
Consultant	1/day	same
Well loggers	3 trips/well	same
<b>Gathering systems</b>	8/day	same
<b>Power systems</b>	2/day	same
<b>Compressor stations</b>	2/day	same
<b>Other field development</b>	3/day	same
<b>Testing and operations</b>	2/day	same
<b>Notes:</b>		
a Engineers travel to pod weekly and stay in a trailer in the pod during the week.		
b Current plans are to establish a central supply area within a pod and deliver supplies on a weekly basis.		
c Water trucks would deliver water to rigs from a location within the pod.		
d Current plans are to establish a central mud location within a pod and deliver mud on a weekly basis.		
e It would require 4 trucks to move each rig to a pod. Upon completion of drilling in a pod, each rig would move to the next pod.		

### 2.1.6 Site Restoration and Abandonment

Merit proposes to completely reclaim all disturbed areas not needed for production activities. Reclamation would generally include: (1) complete cleanup of the disturbed areas (drill sites, access roads, etc.), (2) restoration of the disturbed areas to the ground contour that existed prior to construction, (3) replacement of topsoil over all disturbed areas, (4) ripping of disturbed areas to a depth of 12 to 18 inches, and (5) seeding of reclaimed areas with a BLM approved

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seed mixture. If the well proves productive, all disturbed areas unnecessary for production operations would be reclaimed within 2 years after drilling operations cease. If the well does not prove to be feasibly productive, or once production operations have ceased and the well is plugged and abandoned, the entire disturbed area would be reclaimed within 2 years following the end of operations.

### 2.1.7 Summary of Estimated Disturbances

The following Table 2-2 summarizes the estimated disturbances that would result with implementation of the BCPA project.

**Table 2-2. Disturbance Estimates - Brown Cow Pod.**

Merit - Brown Cow Pod				
Facility	Development Phase			Operations
	Length (feet)	Width (feet)	Acres	Acres
New Roads (includes gas and water ROWs)	6,273	40	5.76	5.76
Existing Roads to be upgraded	4,023	0	0	0
Gas Lines (to sales line)	27,261	30	18.77	0
Drill Pads (12)	190	240	12.6	0.06
Compressor Station (0)	0	0	0	0
Injection Well (2)	150	150	1.03	1.03
Pumping Stations (2)	120	120	0.66	0.66
<b>Total Disturbance</b>			<b>38.82</b>	<b>7.51</b>

### 2.1.8 Project-Wide Mitigation Measures and Procedures

Merit proposes to implement the following mitigation measures, procedures, and management requirements on public lands to avoid or mitigate resource or other land use impacts. An exception to a mitigation measure and/or design feature may be approved on public land on a case-by-case basis when deemed appropriate by the BLM. An exception would be approved only after a thorough, site-specific analysis determined that the resource or land use for which the measure was put in place is not present or would not be significantly impacted.

#### 2.1.8.1 Preconstruction Planning and Design Measures

1. Merit and the BLM have made on-site interdisciplinary (ID) team inspections of each proposed and staked facility site (e.g., well sites), new access road, access road reconstruction, and pipeline alignment projects so that site-specific recommendations and mitigation measures can be developed. Inspections were completed August 15, 2003.
2. New road construction and maintenance of existing roads in the BCPA would be accomplished in accordance with BLM Manual 9113 standards.

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3. Merit would prepare and submit an APD for each drill site on federal leases to the BLM for approval prior to initiation of construction. Also, prior to construction, Merit or its contractors would submit Sundry Notices and/or ROW applications for pipelines and access road segments on federal leases. The APD would include a Surface Use Plan that would show the layout of the drill pad over the existing topography, dimensions of the pad, volumes and cross sections of cut and fill (when required), location and dimensions of reserve pit(s), and access road egress and ingress. The APD, Sundry Notice, and/or ROW application plan would also itemize project administration, time frame, and responsible parties.
4. Access road Plan & Profile drawings prepared by a licensed surveyor will be submitted to the BLM for review and approval prior to the approval of Brown Cow Federal #12-13 and Brown Cow Federal #32-13.

### 2.1.8.2 Resource-Specific Requirements

Merit proposes to implement the following resource-specific mitigation measures, procedures, and management requirements on public lands.

#### 2.1.8.2.1 Range Resources and Other Land Uses

Mitigation requirements listed under Soils, Vegetation and Wetlands, and Wildlife also apply to Range Resources and Other Land Uses.

1. Merit would coordinate with the affected livestock operators to ensure that livestock control structures remain functional during drilling and production operations

#### 2.1.8.2.2 Air Quality

1. All BLM conducted or authorized activities (including natural gas development alternatives) must comply with applicable local, state, tribal and Federal air quality regulations and standards. Merit would adhere to all applicable ambient air quality standards, permit requirements (including preconstruction, testing, and operating permits), motorized equipment and other regulations, as required by the State of Wyoming, Department of Environmental Quality, Air Quality Division (WDEQ-AQD).
2. Merit would not allow burning garbage or refuse at well locations or other facilities. Any open burning would be conducted under the permitting provisions of Section 13 of the Wyoming Air Quality Standards and Regulations (WDEQ-AQD 1989).
3. On Federal land, Merit will initiate immediate abatement of fugitive dust (by application of water, chemical dust suppressants, or other measures) during road construction operations and during subsequent use.. The BLM would approve the control measure, location, and application rates. If watering is the approved control measure, the operator must obtain the water from state-approved source(s).

#### 2.1.8.2.3 Transportation

1. Existing roads should be used as collectors and local roads whenever possible. Standards for road design should be consistent with BLM Road Standards Manual Section 9113.
2. Roads not required for routine operation and maintenance of producing wells and

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- ancillary facilities would be permanently blocked, reclaimed, and revegetated.
3. Areas with important resource values, steep slopes and fragile soils should be avoided where possible in planning for new roads.

### 2.1.8.2.4 Minerals/Paleontology

Mitigation measures presented in the Soils and Water Resources sections would avoid or minimize many of the potential impacts to the surface mineral resources. Protection of subsurface mineral resources from adverse impacts would be provided by the BLM casing and cementing policy.

Paleontological resource values would be protected through the following mitigation measure:

1. If recommended by the BLM, each proposed facility located in areas with known and potential vertebrate paleontological resource significance (Class II) would be surveyed by a BLM-approved paleontologist prior to surface disturbance (USDI-BLM 1987b; 1990a). Also, if paleontological resources are discovered at any time during construction, all construction activities would halt and BLM personnel would be immediately notified. Work would not proceed until paleontological materials are properly evaluated by a qualified paleontologist.

### 2.1.8.2.5 Soils

1. Reduce the area of disturbance to the absolute minimum necessary for construction and production operations while providing for the safety of the operation.
2. Where feasible, locate pipelines immediately adjacent to roads to avoid creating separate areas of disturbance and in order to reduce the total area of disturbance.
3. Avoid using frozen or saturated soils as construction material.
4. Minimize construction activities in areas of steep slopes (in excess of 25%).
5. Design cutslopes in a manner that would allow retention of topsoil, surface treatment such as mulch, and subsequent revegetation.
6. Selectively strip and salvage topsoil or the best suitable medium for plant growth from all disturbed areas to a minimum depth of 6 inches on all well pads.
7. Where possible, minimize disturbance to vegetated cuts and fills on existing roads that are improved.
8. Install runoff and erosion control measures such as water bars, berms, and interceptor ditches if needed.
9. Install culverts for ephemeral and intermittent drainage crossings. Design all drainage crossing structures to carry the 50-year discharge event, or as otherwise directed by the BLM.
10. Implement minor routing variations during access road layout to avoid steep slopes adjacent to ephemeral or intermittent drainage channels. Maintain a 100-foot wide buffer strip of natural vegetation where possible (not including wetland vegetation) between all construction activities and ephemeral and intermittent drainage channels.

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11. Include adequate drainage control devices and measures in the road design (e.g., road berms and drainage ditches, diversion ditches, cross drains, culverts, out-sloping, and energy dissipators) at sufficient intervals and intensities to adequately control and direct surface runoff above, below, and within the road environment to avoid erosive concentrated flows. In conjunction with surface runoff or drainage control measures, use erosion control devices and measures such as temporary barriers, ditch blocks, erosion stops, mattes, mulches, and vegetative covers. Implement a revegetation program as soon as possible to re-establish the soil protection afforded by a vegetal cover.
12. Upon completion of construction activities, restore topography to near pre-existing contours at the well sites, along access roads and pipelines, and other facilities sites; replace up to 6 inches of topsoil or suitable plant growth material over all disturbed surfaces; apply fertilizer as required; seed; and mulch.

### 2.1.8.2.6 Water Resources

Other mitigation measures listed in the Soils, and Vegetation and Wetlands sections would also apply to Water Resources.

1. Limit construction of drainage crossings to no-flow periods.
2. Minimize the area of disturbance within perennial, ephemeral and intermittent drainage channel environments.
3. Prohibit construction of well sites, access roads, and pipelines within 500 feet of surface water and/or riparian areas. Possible exceptions to this would be granted by the BLM based on an environmental analysis and site-specific mitigation plans.
4. Design channel crossings to minimize changes in channel geometry and subsequent changes in flow hydraulics.
5. Maintain vegetation barriers occurring between construction activities and ephemeral and intermittent channels.
6. Design and construct interception ditches, sediment traps/silt fences, water bars, silt fences and revegetation and soil stabilization measures if needed.
7. Construct channel crossings by pipelines such that the pipe is buried a minimum of four feet below the channel bottom.
8. Regrade disturbed channel beds to the original geometric configuration and the same or very similar bed material replaced.
9. Case wells during drilling, and case and cement all wells in accordance with Onshore Order No. 2 to protect all high quality water aquifers. High quality water aquifers are aquifers with known water quality of 10,000 TDS or less. Include well casing and welding of sufficient integrity to contain all fluids under high pressure during drilling and well completion. Further, wells would adhere to the appropriate BLM cementing policy.
10. Construct the reserve pits in cut rather than fill materials or compact and stabilize fill. Inspect the subsoil material of the pit to be constructed in order to assess soil stability and permeability and whether reinforcement and/or lining are required. If lining is required, line the reserve pit with a reinforced synthetic liner at least 12 mils in thickness and a bursting strength of 175 x 175 pounds per inch (ASTMD 75179). Consideration



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should be given to use of closed or semi-closed drilling systems in situations where a liner may be required.

11. Maintain two feet of freeboard on all reserve pits to ensure the reserve pits are not in danger of overflowing. Shut down drilling operations until the problem is corrected if leakage is found outside the pit.
12. Extract all water used during construction activities from sources with sufficient quantities and through appropriation permits approved by the State of Wyoming.
13. Discharge all concentrated water flows within access road ROWs onto or through an energy dissipator structure (e.g., riprapped aprons and discharge points) and discharge into undisturbed vegetation.
14. Develop and implement a storm water pollution prevention plan (SWPPP) for storm water runoff at drill sites as required per Wyoming Department of Environmental Quality (WDEQ) storm water National Pollution Discharge Elimination System (NPDES) permit requirements. The WDEQ requires operators to obtain a field permit for fields of 20 wells or more.
15. Exercise stringent precautions against pipeline breaks and other potential accidental discharges of toxic chemicals into adjacent streams. If liquid petroleum products are stored on-site in sufficient quantities (per criteria contained in 40 CFR Part 112), a Spill Prevention Control and Countermeasures (SPCC) plan would be developed in accordance with 40 CFR Part 112, dated December 1973.
16. Coordinate all crossings or encroachments of waters of the U.S. with the U.S. Army Corps of Engineers (COE).

### **2.1.8.2.7 Fisheries**

1. No fisheries mitigation is needed beyond that indicated under Water Resources (2.1.8.2.7) and Special Status Species Fish (2.1.8.2.10).

### **2.1.8.2.8 Vegetation and Wetlands**

Other mitigation measures under Soils and Water Resources would also apply to vegetation and wetlands.

1. Evaluate all project facility sites for occurrence and distribution of waters of the U.S., special aquatic sites, and jurisdictional wetlands. All project facilities would be located out of these sensitive areas. If complete avoidance is not possible, minimize impacts through modification and minor relocations. Coordinate activities that involve dredge or fill into wetlands with the COE.

### **2.1.8.2.9 Wildlife**

1. During reclamation, establish a variety of forage species that are useful to resident herbivores.
2. Prohibit unnecessary off-site activities of operational personnel in the vicinity of the drill sites. Inform all project employees of applicable wildlife laws and penalties associated with unlawful take and harassment.

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3. Limit construction activities as per BLM authorizations within big game crucial winter range from November 15 to April 30.
4. Survey and clear well sites within one mile of raptor nests identified in the raptor survey prior to the commencement of drilling and construction during the raptor nesting period (February 1 through July 31).
5. When an 'active' raptor nest is within 0.75 to one mile (depending on species and line of sight) of a proposed well site, restrict construction during the critical nesting season for that species.
6. Do not perform construction activities within 0.25 mile of existing, active sage grouse leks..
7. Provide for sage grouse lek protection during the breeding, egg-laying and incubation period (March 1 - June 30) by restricting construction activities within a two-mile radius of active sage grouse leks. Exceptions may be granted if the activity would occur in unsuitable nesting habitat.

### **2.1.8.2.10 Special Status Species**

#### **Special Status Plants**

1. Employ site-specific recommendations developed by the BLM IDT for staked facilities.
2. Minimize impacts due to clearing and soil handling.
3. Monitor and control noxious weeds.
4. Comply with Section 404(b)(1) guidelines of the federal Clean Water Act (CWA).
5. Perform clearance surveys for plant species of concern.

#### **Special Status Animals**

1. Implement measures discussed in Chapter 4 (Section 4.8.5) in compliance with the Endangered Species Act (ESA),

### **2.1.8.2.11 Visual Resources**

1. Utilize existing topography to screen roads, pipeline corridors, drill rigs, well heads, and production facilities from view.
2. Paint well and central facilities site structures with flat colors (e.g., Carlsbad Canyon) as recommended by the BLM, that blend with the adjacent surrounding undisturbed terrain, except for structures that require safety coloration in accordance with Occupational Safety and Health Administration (OSHA) requirements.

### **2.1.8.2.12 Noise**

1. Muffle and maintain all motorized equipment according to manufacturers' specifications.

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### **2.1.8.2.13 Recreation**

Measures under Wildlife, Transportation, Soils, Health and Safety, and Water Resources apply to Recreation.

1. Minimize conflicts between project vehicles and equipment and recreation traffic by posting appropriate warning signs, implementing operator safety training, and requiring project vehicles to adhere to low speed limits.

### **2.1.8.2.14 Socioeconomics**

1. Implement hiring policies that would encourage the use of local or regional workers who would not have to relocate to the area.
2. Coordinate project activities with ranching operations to minimize conflicts involving livestock movement or other ranch operations. This would include scheduling of project activities to minimize potential disturbance of large-scale livestock movements. Establish effective and frequent communication with affected ranchers to monitor and correct problems and coordinate scheduling.
3. Merit and its subcontractors would obtain Carbon County sales and use tax licenses for purchases made in conjunction with the project so that project-related sales and use tax revenues would be distributed to Carbon County.

### **2.1.8.2.15 Cultural Resources**

1. If a site is considered eligible for, or is already on the National Register of Historic Places (NRHP), avoidance is the preferred method for mitigating adverse effects to that property.
2. Adverse effects to eligible cultural or historical properties that cannot be avoided would be mitigated by preparing and implementing a cultural resources mitigation plan on a case by case basis.
3. If cultural resources are discovered at any time during construction, all construction activities would halt and the BLM Authorized Officer (AO) would be immediately notified. Work would not resume until a Notice to Proceed is issued by the BLM AO.
4. Open trench inspections and construction monitors would be employed by Merit for all surface disturbing activities.
5. Cultural inventories would be completed prior to construction activities as a part of the APD/ROW approval process. Should any finds be made during the inventories, additional work may be required as determined on a case by case basis.

### **2.1.8.2.16 Health and Safety**

Measures listed under Air Quality and Water Quality also apply to Health and Safety.

1. Sanitation facilities installed on the drill sites would be approved by the WDEQ.
2. To minimize undue exposure to hazardous situations, require measures that would preclude the public from entering hazardous areas and place warning signs alerting the

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public of truck traffic.

3. Haul all garbage and rubbish from the drill site to a State-approved sanitary landfill for disposal. Collect and store any garbage or refuse materials on location prior to transport in containers approved by the BLM.
4. During construction and upon commencement of production operations, Merit would have a chemical or hazardous substance inventory for all such items that may be at the site. Merit would institute a Hazard Communication Program for its employees and would require subcontractor programs in accordance with OSHA 29 CFR 1910.1200. These programs are designed to educate and protect the employees and subcontractors with respect to any chemicals or hazardous substances that may be present in the work place. It would be required that as every chemical or hazardous material is brought on location, a Material Safety Data Sheet (MSDS) would accompany that material and would become part of the file kept at the field office as required by 29 CFR 1910.1200. All employees would receive the proper training in storage, handling, and disposal of hazardous substances.
5. Spill Prevention Control and Countermeasure Plans would be written and implemented as necessary in accordance with 40 CFR Part 112 to prevent discharge into navigable waters of the United States.
6. Chemical and hazardous materials would be inventoried and reported in accordance with the Superfund Amendments and Reauthorization Act (SARA) Title III. 40 CFR Part 335, if quantities exceeding 10,000 pounds or the threshold planning quantity (TPQ) are to be produced or stored in association with the Proposed Action. The appropriate Section 311 and 312 forms would be submitted at the required times to the State and County Emergency Management Coordinators and the local fire departments.
7. Any hazardous wastes, as defined by the Resource Conservation and Recovery Act (RCRA), would be transported and/or disposed of in accordance with all applicable federal, state, and local regulations.
8. Merit plans to design operations to severely limit or eliminate the need for Extremely Hazardous substances. Merit also plans to avoid the creation of hazardous wastes as defined by RCRA wherever possible.

### **2.2 ALTERNATIVE A - NO ACTION**

Section 1502.14(d) of the National Environmental Policy Act (NEPA) requires that the alternatives analysis in the environmental impact statement (EIS) "include the alternative of no action". "No Action" implies that on-going natural gas production activities would be allowed to continue by the BLM in the BCPA, but the proposed field development program (Proposed Action) would be disallowed. Additional APDs and ROW actions would be considered by the BLM for federal land on a case-by-case basis consistent with the scope of existing environmental analysis. Transport of natural gas products would be allowed from those wells within the BCPA that are currently productive. Additional gas development could occur on private lands within the project area under APDs approved by the WOGCC.

The U.S. Department of the Interior's (USDI) authority to implement a "No Action" alternative is limited because the public lands have already been leased. An explanation of this limitation and the discretion the USDI has in this regard follows.

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- € An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove and dispose of all oil and gas deposits" in the leased lands, subject to the terms and conditions incorporated in the lease (Form 3110-2). Because the Secretary of the Interior has the authority and responsibility to protect the environment within federal oil and gas leases, restrictions are imposed on the lease terms.
- € Leases within the ARPA contain various stipulations concerning surface disturbance, surface occupancy and limited surface use. In addition, the lease stipulations provide that the USDI may impose "such reasonable conditions, not inconsistent with the purposes for which [the] lease is issued, as the [BLM] may require to protect the surface of the leased lands and the environment." None of the stipulations, however, would empower the Secretary of the Interior to deny all drilling activity because of environmental concerns.
- € Provisions in leases that expressly provide Secretarial authority to deny or restrict APD development in whole or in part would depend on an opinion provided by the U.S. Fish and Wildlife Service (FWS) regarding impacts to endangered or threatened species or habitats of plants or animals that are listed or proposed for listing (e.g., bald eagle). If the FWS concludes that the Proposed Action and alternatives would likely jeopardize the continued existence of any endangered or threatened plant or animal species, then the APD(s) and Atlantic Rim development may be denied in whole or in part.

### **2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL**

The BLM requires the development of alternatives when there are unresolved conflicts involving alternative uses of available resources. Based upon scoping comments received for the Atlantic Rim EIS, and interdisciplinary review of the proposed action, no unresolved conflicts were identified to drive another alternative for analysis in the environmental assessment.